BIG-OH

$5n + \lg(n) - 12 \leq 5n + \lg(n) - 12$

$5n + \lg(n) - 12 \leq 5n + \lg(n)$

$5n + \lg(n) - 12 \leq 5n + 10n$ $\quad n \geq 0$

$5n + \lg(n) - 12 \leq 15n$ $\quad n \geq 0$

$n0 = 0$ $\quad c = 15$

$O(n)$

OMEGA

$5n + \lg(n) - 12 \geq 5n + \lg(n) - 12$

$5n + \lg(n) - 12 \geq 5n - 12$ $\quad n \geq 1$

$5n + \lg(n) - 12 \geq 5n$ $\quad n \geq 12$

$n0 = 12$ $\quad c = 5$

$O(n)$

RECURRENCE RELATION

$T(1) = 1$

$T(0) = 1$

$T(n) = T(n-1) + 1$

$= T(n-1-1) + 1 + 1$

$= T(n-2) + 2$

$= T(n-2-1) + 2 + 1$

$= T(n-3) + 3$

$= T(n-3-1) + 3 + 1$

$= T(n-4) + 4$

$= T(n-i) + i$

$n - i =$ base case (aka 0 or 1) $\Rightarrow i = n$

$= T(n-n) + n$

$= 1 + n$

$= O(n)$

RECURRENCE RELATION #2

$T(1) = 1$

$T(n) = T(n-1) + T(1) + T(n-1)$

$= 2T(n-1) + 1$

$= 2(2T(n-1-1) + 1) + 1$

$= 4T(n-2) + 2 + 1$

$= 4(2T(n-2-1) + 1) + 2 + 1$

$= 8T(n-3) + 4 + 2 + 1$

$= 2^i T(n-i) + 2^i - 1$

$n - i =$ base case (aka 1) $\Rightarrow i = n - 1$

$= 2^{n-1} T(n-(n-1)) + 2^{n-1} - 1$

$= 2^n n - 1$

$= O(2^n)$